

TAXONOMIC CHANGES IN NEARCTIC PTEROMALIDAE, II.
NEW SYNONYMY AND FOUR NEW GENERA
(HYMENOPTERA: CHALCIDOIDEA)

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Abstract.—*Belonura* Ashmead, 1896 is synonymized with *Urolepsis* Walker, 1846, n. syn., with the only described species of *Belonura* transferred as *Urolepsis singularis* (Ashmead), 1896, n. comb. *Systellogaster* Gahan, 1917 is raised from synonymy with *Tritneptis* Girault, 1908, **revived status**, with two included species known as *S. ovivora* Gahan, 1917, **revived status**, and *S. gahani* Wallace, 1973, **revived status**. Four new genera of Nearctic Pteromalidae are described—*Baridobius* Heydon, n. gen. (Colotrechinae) with its included species, *B. primulus* Heydon, n. sp.; *Guolina* Heydon, n. gen. (Pteromalinae) with three included species, *G. fulgida* Heydon, n. sp., *G. insularum* Heydon, n. sp., and *G. psenophaga* Heydon, n. sp.; *Lysirina* Heydon, n. gen. (Pteromalinae) with its included species, *L. polychroma* Heydon, n. sp.; and *Quercanus* Heydon, n. gen. (Pteromalinae) with two included species, *Q. leuteogaster* Heydon, n. sp. and *Q. viridigaster* Heydon, n. sp. *Baridobius* species are known from Curculionidae on roots of *Xanthium*; *Guolina* and *Quercanus* are associated with gall making Cynipidae on oaks or roses. The hosts of *Lysirina* remain unknown. Keys are given for the Nearctic species of *Guolina* and *Quercanus*.

Key Words: Hymenoptera, Chalcidoidea, Pteromalidae, *Belonura*, *Urolepsis*, *Systellogaster*, *Tritneptis*, *Baridobius*, *Guolina*, *Lysirina*, *Quercanus*, new genera, new species

In the course of reviewing the genera of the Pteromalidae in preparation for a key to the Nearctic genera by Z. Bouček (BMNH) and the author, many new genera and some misplacements of species of Nearctic Pteromalidae were discovered. Some of these changes are published in Heydon and Bouček (1992) and over 30 new Nearctic pteromalid genera are described in Bouček (1993). Four additional new genera are described and two changes in generic synonymy are presented herein.

Terminology in this paper generally follows that of Graham (1969), except that genal concavity is used instead of genal hol-

low and club is used instead of clava. In addition, the gastral tergites are numbered T1-T7 beginning with the first tergite after the petiole. The following abbreviations are used: the median ocellar diameter is MOD, the ocellar-ocular distance is OOL, the posterior ocellar distance is POL, the lateral ocellar distance is LOL, the multiporous plate sensilla are MPP sensilla, the lower ocular line is LOeL, and the antennal funicular segments are F1 through F6. The units of measurement given in the descriptions can be converted to millimeters by multiplying by 0.02. The acronyms for the museums from which material was bor-

rowed are listed in the acknowledgments section.

SYNONYMY

Research to prepare a key to the Nearctic genera of the Pteromalidae gave Dr. Z. Bouček and the author the chance to study the types of the genera *Urolepsis* Walker, 1846, and *Belonura* Ashmead, 1896. It was observed that females assigned to the two genera are very similar except for the black coloration and elongate terminal gastral tergite of female *Belonura*. *Belonura* is herein synonymized with *Urolepsis*, with the only described species of *Belonura* now known as *Urolepsis singularis* (Ashmead), 1896, n. comb.

Systellogaster Gahan was described for the species *S. ovivora* Gahan, 1917. Later, in his treatment of the genera similar to *Dibrachys* Förster, 1856, Wallace (1973) added the species *S. gahani*. Grissell (1985) synonymized *Systellogaster* with *Tritneptis* Girault based in part on the similarity between *S. ovivora* and *Tritneptis scutellata* Muesebeck, 1927. Reexamination of the relevant types revealed additional characters to separate *Systellogaster* species from *Tritneptis*. *Systellogaster* species have an unusual condition of the marginal vein of the forewing in that it is slightly removed from the front edge of the wing. This leaves a short membranous strip all along the front margin of the wing. Relative to *Tritneptis* species other differences include a more elongate marginal vein (more than 3× as long as the stigmal vein), a more elongate pedicel (fully 2.5× as long as broad in dorsal view), and unusual types of sculpturing (either dull with extremely fine reticulations in *S. ovivora* or extensively smooth in *S. gahani*). On this basis, *Systellogaster* Gahan, 1917, revived status is herein raised from synonymy with *Tritneptis* Girault, 1908, with its included species known as *S. ovivora* Gahan, 1917, revived status, and *S. gahani* Wallace, 1973, revived status.

NEW TAXA Colotrechninae

Baridobius Heydon, NEW GENUS

Type species.—*Baridobius primulus* Heydon, 1993.

Description.—Body color very dark, only weakly metallic. Body sculpture weak, almost smooth. Head with oral foramen very broad, almost as wide as head width (Fig. 9), clypeus with anterior margin weakly convex; torulus just below LOcL. Antenna (Fig. 1) with combined length of scape and pedicel less than head width in females, about as long as head width in males, all funicular segments transverse in both sexes; antennal formula 1:1:2:6:3; MPP sensilla in single row on each funicular segment; club simple apically. Mesosoma depressed (Fig. 10); collar with anterior edge rounded; axilla advanced; scutellum with lateral face inflated; frenal sulcus distinct impressed line; propodeum with plicae absent, spiracular sulci shallow, callus nearly bare, spiracle circular; legs with hind tibia broadened and flattened, length only about 6× medium width, hind tibia with 2 apical spurs. Forewing (Fig. 2) with speculum developed, not margined posteriorly by setae; marginal vein relatively thick. Gaster sessile; in females relatively long (Fig. 10); with protruding ovipositor.

The characteristic advanced axillae and laterally inflated scutellum place *Baridobius* in the Colotrechninae. Unique characters of *Baridobius* within the subfamily include the very broad oral foramen, the non-metallic coloration, and the depressed body.

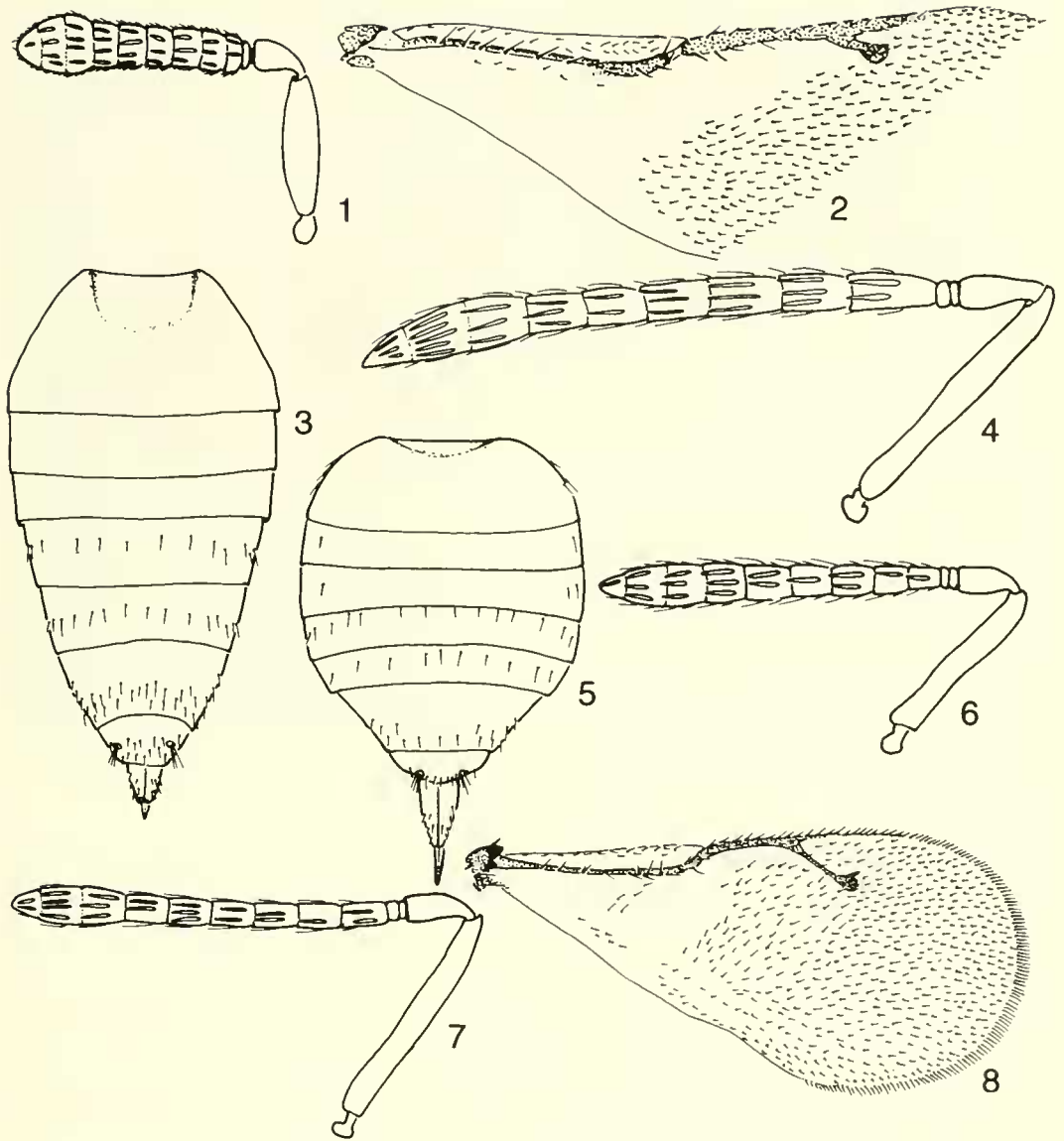
Etymology.—The generic name is an arbitrary combination of letters based on the generic name of the only known host of *Baridobius* species. The gender is masculine.

Baridobius primulus Heydon,

NEW SPECIES

Figs. 1, 2, 9, 10

Description.—Holotype, female. Color: Head, mesosoma bluish black; gaster dark



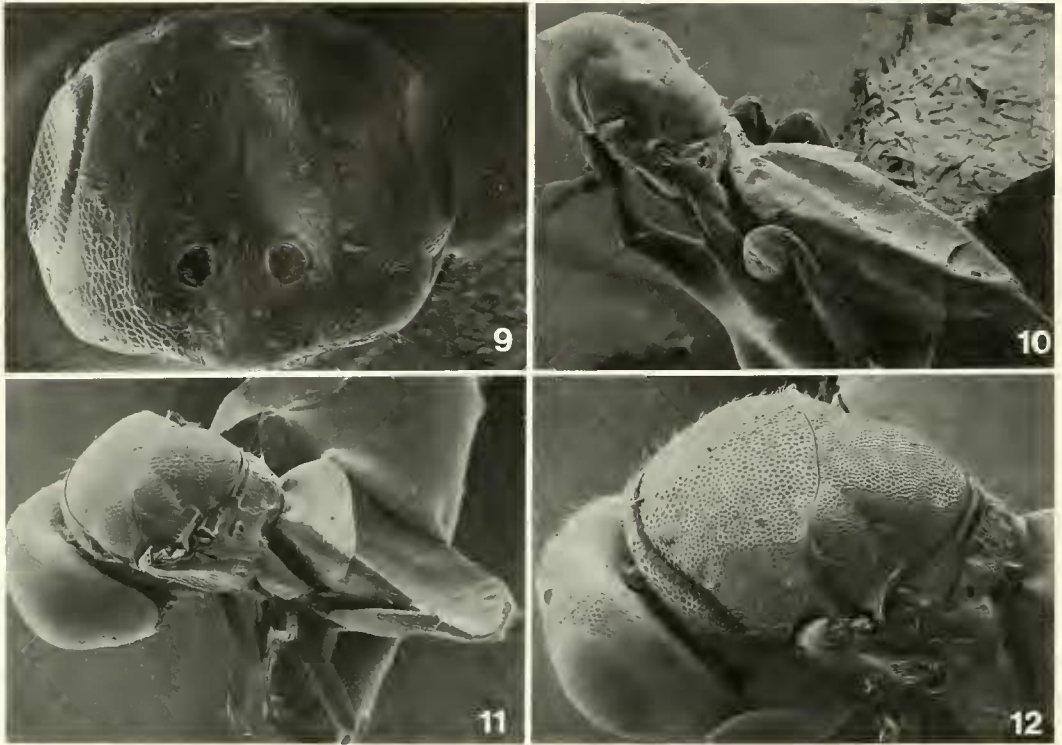
Figs. 1-8. *Bardobius primulus*, female. 1, Antenna. 2, Forewing. *Guolina insularum*, female. 3, Gaster. 4, Antenna. *Guolina psenophaga*, female. 5, Gaster. 6, Antenna. *Guolina fulgida*, female. 7, Antenna. *Guolina psenophaga*, female. 8, Forewing.

reddish brown. Antenna dark reddish brown with scape paler in basal $\frac{1}{2}$. Legs with coxae, femora dark reddish brown; tibiae, tarsi brownish yellow. Wings hyaline, with veins pale brown.

Sculpture: Clypeus smooth over anterior $\frac{1}{3}$, finely coriaceous over remainder (Fig. 9). Sculpture of head, mesosoma, gaster weak,

coriaceous (Fig. 10); propodeum with depressed median area smooth, remainder coriaceous.

Structure: Body length 1.6 mm. Head (Fig. 9) width $1.1 \times$ height (23:20), $2.5 \times$ length (23:10); eye height $1.5 \times$ length (10.5:7.0), $2.3 \times$ malar distance (10.5:4.5), eye length $2.3 \times$ temple length (7.0:3.0); ratio of MOD,



Figs. 9-12. *Baridobius primulus*, female. 9, Head, anterior view. 10, Mesosoma and gaster. *Guolina psenophaga*, female. 11, Whole body. *Quercanus luteogaster*, female. 12, Head and mesosoma.

OOL, POL, LOL as 2.0:4.0:6.0:2.5. Antenna (Fig. 1) with length of pedicel plus flagellum $0.87 \times$ head width (20:23); relative lengths of scape, pedicel, anelli, F1-6, club as 9.0:3.0:1.0:1.5:1.5:2.0:2.0:2.0:2.0:5.0; relative widths of F1, F6, club as 3.0:3.0:4.0; 1st anellus minute, $\frac{1}{2}$ width of 2nd anellus. Mesosoma length $1.4 \times$ width (27:20); propodeum with shallow median depression which is narrow anteriorly but broadened posteriorly (Fig. 10). Forewing (Fig. 2) length $2.3 \times$ width (55:24); relative lengths of submarginal, marginal, postmarginal, stigmal vein as 19.0:12.0:6.0:3.0; stigma hemispherical. Gaster length $2.2 \times$ width (46:21), $1.3 \times$ combined length of head and mesosoma (46:36); hypopygium extending $\frac{1}{2}$ length of gaster.

Allotype, male.—Similar to holotype except: tibiae dark like femora. Body length 1.1 mm. Antenna with length of pedicel plus flagellum $0.97 \times$ head width (17.5:18.0), rel-

ative lengths of scape, pedicel, anelli, F1-6, club as 5.0:3.0:1.0:1.5:1.0:1.5:1.5:1.5:1.5:5.0; relative widths of F1, F6, club as 2.0:2.5:3.5; flagellum with setae short and dense, appearing pilose. Gaster length $1.6 \times$ width (26:16); aedeagus exceptionally long.

Variation.—The body length of females examined varied from 1.6 to 1.9 mm; *Baridobius primulus* is relatively uniform in appearance otherwise.

Type material.—The holotype, allotype (both USNM) and 4 female and 1 male paratypes (BMNH, USNM) were collected at Eaglenest, Minnesota on 20 August 1958 by W. V. Balduf. Three other female paratypes were collected as follows (UCDC, USNM). ARIZONA: Continental, 31.VII.1966, 1 ♀. KANSAS: Clark Co., II.1933 (reared from *Baris callida*), 1 ♀; Meade Co., II.1933 (reared from *Baris callida*), 1 ♀.

Etymology.—The species name is from

the Latin word *primus*, meaning first, and refers to the fact that this is the first described species of *Baridobius*.

Biology.—The two paratype specimens from Kansas were reared from *Baris callida* Casey (Coleoptera: Curculionidae). Larvae of this weevil feed in the stems of cocklebur [*Xanthium* Asteraceae], burrowing down toward the root where they then pupate (Blatchley and Leng 1916).

Pteromalinae

Guolina Heydon, NEW GENUS

Type species.—*Guolina fulgida* Heydon, 1994.

Description.—Body color dark to bright metallic. Body sculpture delicate but distinct; alveolae of mesoscutum and head exceptionally large and round, distinctly larger than alveolae of scutellum (Fig. 11); upper mesepimeron smooth. Head in anterior view broadly ovate, with oral foramen relatively wide, anterior margin of clypeus with broad but slightly to almost imperceptibly produced truncate median portion which is almost straight mesally; face with striae only in immediate vicinity of clypeus; gena convex above mandibles; toruli below center of head, just above LOCL; occiput lacking carina. Antenna with 2 anelli and 6 funicular segments; pedicel slender; flagellum filiform to weakly clavate (Figs. 4, 6, 7); F1 at most as wide as pedicel; MPP sensilla in single row on each funicular segment; club lacking large patch of micropilosity. Mesosoma with pronotum rather narrow (plane of prepectus nearly at right angles to that of mesopleuron), neck very short, with short horizontal collar which lacks anterior transverse carina (Fig. 11); notauli incomplete; scutellum broadly abutting mesoscutum; frenal area demarcated by area of distinct texture; propodeum with more or less well developed median carina, plicae only weakly developed, spiracles short ovate and about their own longest diameter from metanotum, nucha weakly developed convex lunate region. Gaster sessile, at most as long as combined

length of head and mesosoma, broadly ovate; hind margin of T1 straight (Figs. 3, 5). Forewing (Fig. 8) with well developed speculum which is not bounded by setae posteriorly; postmarginal vein longer than stigmal vein; stigmal vein nearly as long as marginal vein. Hind leg with coxa bare dorsally; tibia with one apical spur.

A distinguishing combination of characters for *Guolina* includes the head broadly ovate in anterior view, the clypeus being nearly straight across, the delicate and round reticulation of the head and mesoscutum (Fig. 11), the slender and filiform antenna (Figs. 4, 6, 7), the relatively narrow pronotum, the propodeum with nucha and plicae only weakly developed (Fig. 11), and the spiracles round to shortly ovate and $1 \times$ their own diameter from the anterior margin of the propodeum.

Two other pteromalid genera found on the same oaks in central California resemble *Guolina* rather closely. *Cecidostiba* differs in having the reticulation of the head and mesoscutum relatively coarse and dense, and a nucha that is triangular and is bordered anteriorly by a sharp edge (see illustration in Bouček and Rasplus 1990, electroscan photograph 63). *Amphidocius* Dzhanokmen is also similar but *Amphidocius* differs in the female antenna, which has only eight segments between the pedicel and club, and in having the marginal vein short and thick (see fig. 13 in Heydon and Bouček 1992).

Guolina might be confused with small species of *Pteromalus* Swederus, but *Pteromalus* species are more coarsely alveolate with the alveolae of the mesoscutum relatively smaller and irregular in outline, have the genae almost straight and the oral foramen narrower, the anterior margin of the clypeus distinctly truncate and usually with a distinct median emargination, the flagellum of the antenna almost always broader than the pedicel, and the spiracle distinctly ovate and at the anterior margin of the propodeum touching the metanotum.

Etymology.—*Guolina* is named in honor of Guo Lin for her years of dedicated service

here in the Bohart Museum. The gender is feminine.

Biology.—All three known species of *Guolina* are probably associated with Cynipidae on oaks.

KEY TO SPECIES OF *GUOLINA* HEYDON

- 1. Color of vertex and dorsum of mesosoma brilliant metallic green or blue; frons with sharp and distinct color transition between non-metallic and metallic regions. Pale coloration of scape and legs yellow. Gaster usually more or less yellow. Clypeus with anterior margin nearly straight across *G. fulgida* Heydon
- Color of vertex and dorsum of mesosoma metallic green or blue, but not brilliantly shining; frons either uniformly metallic (*G. insularum*) or transition between non-metallic and metallic coloration relatively gradual. Scape and legs either mostly metallic or with pale coloration greyish yellow or more whitish. Gaster brown or metallic green. Clypeus slightly truncate with truncation weakly concave medially 2
- 2. Species larger, body length more than 2.1 mm. Sculpture of head and mesoscutum raised reticulate. Mesoscutum with conspicuous, dark, erect setae. Female pedicel and flagellum longer than head width; funicle with all segments distinctly longer than wide (Fig. 4). Female gaster length more than 1.5 × width (Fig. 3) *G. insularum* Heydon
- Species smaller, body length less than 2.0 mm. Sculpture of head and mesoscutum delicate and only weakly elevated (Fig. 11). Mesoscutum with scattered short, thin, pale setae. Female pedicel and flagellum shorter than head width; funicle with at least terminal two segments quadrate (Fig. 6). Female gaster length usually 1.5 or less times as long as wide (Fig. 5) *G. psenophaga* Heydon

Guolina fulgida Heydon,

NEW SPECIES

Fig. 7

Description.—Holotype, female. Color: Head and mesosoma black except upper 1/2 of frons, vertex, mesoscutum, scutellum, propodeum brilliant metallic blue-green (the boundary between the black and metallic regions sharp); gaster black with T1–2, lateral parts of T3–4 yellow. Antenna with scape yellow, pedicel yellow except black dorsally; flagellum brownish yellow. Legs

with coxae dark brown, remainder yellow. Forewing with veins brownish yellow; region between basal vein and stigma faintly yellow.

Sculpture: Clypeus, lateral areas of lower face to toruli strigulate; remainder of head weakly raised reticulate; mesoscutum regularly and delicately alveolate; scutellum more minutely alveolate; propodeum with median panels weakly alveolate.

Structure: Body length 1.6 mm. Head width 1.2 × height (30:25), 2.0 × length (30:15); clypeus with anterior margin nearly straight across; eye height 1.4 × length (15:11), 1.9 × malar distance (15:8), eye length 3.7 × temple length (11:3); torulus located just above LOcL; ratio of MOD, OOL, POL, LOL as 2.0:3.5:7.0:4.0. Antenna with length of pedicel plus flagellum 0.93 × head width (28:30); relative lengths of scape, pedicel, anelli, flagellum, club as 13.0:4.0:1.0:2.0:3.0:2.5:2.5:3.0:2.5:7.0; relative widths of F1, F6, club as 1.5:2.0:3.0; flagellum weakly clavate; funicular segments all appearing elongate (Fig. 7), with hairs reclinate and very fine so antenna appears almost naked. Mesosoma length 1.3 × width (31:24); dorsum of mesoscutum with setae pale and sparse so appearing almost bare; propodeum with median carina present and plicae strong in median 1/2 only. Forewing with relative lengths of submarginal, marginal, postmarginal, stigmal vein as 26:11:11:14; costal cell with 1 complete row, partial second row of setae in apical 1/3; basal cell bare; basal vein with 1 seta on left wing, none on right. Gaster length 1.2 × width (36:29), 0.82 × combined length of head and mesosoma (36:44); hypopygium extending 0.4 × length of gaster (16:36).

Male.—Unknown.

Variation.—Body length of females examined varied from 1.2 to 2.0 mm. *Guolina fulgida* shows considerable variation in color. The body color varies from blue-green, as in the type, to bright blue. Coloration of the gaster also varies from almost entirely yellow, to some that have the yellow areas

restricted to diffuse longitudinal areas down the lateral sides of the gaster, to the gaster entirely metallic. Six of the 11 examined females had a dark brown band around the base of the femora. The female from Rocklin, California, had the dark band covering almost the entire basal half of the femur. The same is true of the antennal scape—the type has the scape entirely yellow and non-metallic while others have a very dark band around the apical end. The female from Rocklin has almost the entire apical end of the scape dark.

Type material.—Holotype (UCDC) and one female paratype (UCDC) were collected off blue oak at G. L. Stebbins Cold Creek Reserve, 11 km w. Winters, California (USA) on 13 July 1991 by the author. Ten other paratypes were collected as follows (BMNH, UCDC, USNM): United States. CALIFORNIA: 5 miles w. Madison, em. 18.III.1967 (emerged from *Quercus* sp.? twigs), 1 ♀, em. 19.III.1967 (emerged from *Quercus* sp. twigs), 1 ♀; Rocklin, 1.V.1962, 1 ♀; Stebbins Cold Canyon Reserve, 11 km w. Winters, 13.VI.1991 (off blue oak), 1 ♀, 4.VIII.1991 (off blue oak), 1 ♀, 18.VIII.1990, 4 ♀; 4 km w. Winters (on Highway 128), 13.VI.1991 (off oak), 1 ♀.

Etymology.—The species name comes from the Latin word *fulgidus*, meaning shining or gleaming, and refers to the bright coloration of the body in this species.

Biology.—The insect host of *G. fulgida* remains unknown. Most of the specimens collected from the inner side of the coast range west of Winters, California, were taken by the author by sweeping blue oak (*Quercus douglassi* Hooker and Arnott). The specimens from west of Madison emerged from the twigs of an undetermined *Quercus* sp.

Guolina insularum Heydon,

NEW SPECIES

Figs. 3, 4

Description.—Holotype, female. Color: Body dark blue with dorsum of mesosoma more green, basal $\frac{3}{4}$ of T1 green. Antenna

with scape dark brown; remainder brown except apical $\frac{1}{3}$ of pedicel brownish yellow. Legs with femora and middle tibia brown, but with ends brownish yellow; foretibia pale brown but brownish yellow at tips; hind tibia brownish yellow; fore and middle tarsi brownish yellow; hind tarsi cream colored. Forewing with veins brownish yellow, parastigma reddish; membrane clear.

Sculpture: Clypeus and face just laterad of clypeus striate; head, dorsum of mesosoma, median panels of propodeum raised reticulate; T1 smooth, remainder more or less coriaceous.

Structure: Body length 2.3 mm. Head width $1.3 \times$ height (38:30), $2.1 \times$ length (38:18); clypeus with anterior margin slightly produced with this truncate portion weakly concave mesally; eye height $1.5 \times$ length (19:13), $1.8 \times$ malar distance (19.0:10.5), eye length $3.7 \times$ temple length (13.0:3.5); torulus located $1 \times$ own diameter above LOCL; ratio of MOD, OOL, POL, LOL as 3.0:4.5:9.0:4.0. Antenna with length of pedicel plus flagellum $1.1 \times$ head width (42:38); relative lengths of scape, pedicel, anelli, F1–6, club as 17.0:4.5:1.5:5.0:4.5:4.5:4.0:3.5:3.5:9.0; relative widths of F1, F6, club as 2.0:2.5:3.0; all funicular segments appearing distinctly elongate (Fig. 4), with conspicuous reclinate hairs; MPP sensilla in single sparse irregular row on each segment; club with small patch of micropilosity on terminal segment. Mesosoma length $1.4 \times$ width (54:33); dorsum of mesosoma with dark conspicuous hairs; propodeum with median carina present, plicae obscured mesally. Forewing with relative lengths of submarginal, marginal, postmarginal, stigmal veins as 37:17:19:12; costal cell with one complete setal row, 3 setal rows in apical $\frac{1}{3}$; basal cell bare; basal vein with sparse row of setae present, also a few setae on cubital vein below basal cell. Gaster length $1.8 \times$ width (53:29) (Fig. 3), $0.87 \times$ combined length of head and mesosoma (53:61); hypopygium extending $0.64 \times$ length of gaster (34:53).

Allotype, male.—Similar to holotype ex-

cept dorsum of mesosoma olive green, dark bands on tibiae less intense. Body length 1.6 mm. Antenna with length of pedicel plus flagellum $1.3 \times$ head width (45:34); relative lengths of scape, pedicel, anelli, F1–6, club as 13.0:4.0:1.0:6.0:5.0:5.0:4.5:4.0:10.0; widths of F1, F6, club as 2.5:2.5:2.5; MPP sensilla in 1 row extending $\frac{1}{2}$ – $\frac{2}{3}$ funicular segment length; funicle with setae long, moderately dense, projecting at 45° angle. Gaster length $2.4 \times$ width (41:17).

Variation.—The body length of females examined varied from 2.3 to 2.5 mm; the body length of the paratype male measured the same as the allotype. This species shows little variation and the specimens examined closely resemble the holotype and allotype.

Type material.—The holotype (UCDC), allotype (UCDC) and 2 female and 1 male paratypes emerged in November 1968, from galls on *Quercus dumosa* collected in the Cañada del Medio on Santa Cruz Island (Santa Barbara County, California, USA) (UCDC, USNM). The Davis collection also contains an additional 2 female paratypes with the same data except they emerged in October.

Etymology.—The species name, from the Latin word *insularum* meaning insular, refers to the fact that this species is so far only known from the Channel Islands off the southern California coast.

Biology.—The specimens of the type series all emerged in the fall from a gall on California scrub oak, *Quercus dumosa* Nuttall.

Guolina psenophaga Heydon,

NEW SPECIES

Figs. 5, 6, 8, 11

Holotype, female.—Color: Head, mesosoma purplish black except upper $\frac{1}{2}$ of frons, vertex, dorsum of mesosoma dark bluish green; gaster dark reddish brown with dark bluish green reflections on T1, 6–7 and lateral parts of T2–5. Antenna yellow brown except scape with dark brown band extending over middle $\frac{1}{2}$, pedicel brown dorsally.

Legs yellow-brown except basal $\frac{1}{2}$ of fore and middle femur dark brown, weaker brown bands present on fore and middle tibiae. Forewing with veins brown except prestigma and stigmal vein more reddish; membrane clear.

Sculpture: Clypeus and lateral regions of face striate; remainder of head, mesoscutum, scutellum delicately raised reticulate (Fig. 11); propodeum weakly alveolate.

Structure: Body length 1.4 mm. Head width $1.3 \times$ height (28:22), $2.2 \times$ length (28:13); clypeus with anterior margin slightly truncate with truncation weakly concave mesally; eye height $1.4 \times$ length (13.0:9.5), $1.7 \times$ malar distance (13.0:7.5), eye length $3.8 \times$ temple length (9.5:2.5); torulus located just above LOcL; ratio of MOD, OOL, POL, LOL as 2.0:4.5:7.0:3.0. Antenna with length of pedicel plus flagellum $0.93 \times$ head width (26:28); relative lengths of scape, pedicel, anelli, F1–7, club as 11.0:3.0:1.0:2.0:2.5:2.5:2.5:2.5:7.0; relative widths of F1, F6, club as 1.5:2.5:3.0; flagellum slightly but distinctly clubbed; F1–4 elongate, F5–6 quadrate (Fig. 6), with sparse reclinate hairs; MPP sensilla in 1 row per segment, 2–3 visible per segment in lateral view. Mesosoma length $1.2 \times$ width (28.0:22.5); mesoscutum with scattered, short, thin, pale setae; propodeum with median carina almost absent and plicae obscured mesally. Forewing with relative lengths of submarginal, marginal, postmarginal, stigmal veins as 23:11:13:8 (Fig. 8); basal cell with 1 seta on right wing; basal vein setose. Gaster length $1.3 \times$ width (31.0:24.5) (Fig. 5), $0.82 \times$ combined length of head plus mesosoma (31:38) (Fig. 11); hypopygium extending $0.52 \times$ length of gaster (16:31).

Allotype, male.—Similar to holotype except scape brown with weak metallic blue reflections on basal $\frac{1}{2}$; hind femur mostly brown like fore and middle femur. Body length 1.1 mm. Antenna with length of pedicel plus flagellum $1.2 \times$ head width (27.0:22.5); relative lengths of scape, pedicel, anelli, F1–6, club as 9.0:3.0:1.0:2.5:2.5:3.0:

3.0:3.0:3.0:7.0; relative widths of F1, F6, club as 2.0:2.0:2.0; MPP sensilla sparse, only 1 visible per segment in lateral view; setae sparse, long, semierect; basal club segment nearly free from the others; gaster length $2.2 \times$ width (22:10).

Variation.—The metallic body color varies from bluish green to blue. As in *G. fulgida*, there is more variation in the amount of dark pigment on the legs than is typical for other species of Pteromalidae. In a few females, the dark bands on the femora are faint and lacking on the tibiae. Others have dark bands on all the femora and tibiae. In the males, the bands on the femora are more consistent, but their expression on the tibiae is variable.

Type material.—Holotype and allotype (both UCDC) and an additional 7 female and 14 male paratypes (BMNH, CNC, UCDC, USNM) were collected 22.VIII.1990, in G. L. Stebbins Cold Canyon Reserve, 11 km w. Winters, California (USA) by S. L. Heydon. An additional 53 paratypes were collected as follows (UCDC): United States. CALIFORNIA: Davis, 20.III.1976 (ex *Quercus lobata* galls), 1 ♂; 5 miles sw. Madison, em. 3.III.1967, 1 ♀; Mix Canyon, west of Vacaville, em. 19.XII.1967 (*Quercus lobata*), 1 ♀; Stebbins Cold Canyon Reserve, 11 km w. Winters, 18.VIII.1990, 5 ♀, 25 ♂, 22.VIII.1990 [em. from *Neuroterus* sp. (Cynipidae) galls on *Quercus douglasii*], 6 ♀, 14 ♂.

Etymology.—The specific epithet comes from the Greek words *psen*, meaning gall insect, and *phagos*, meaning to eat.

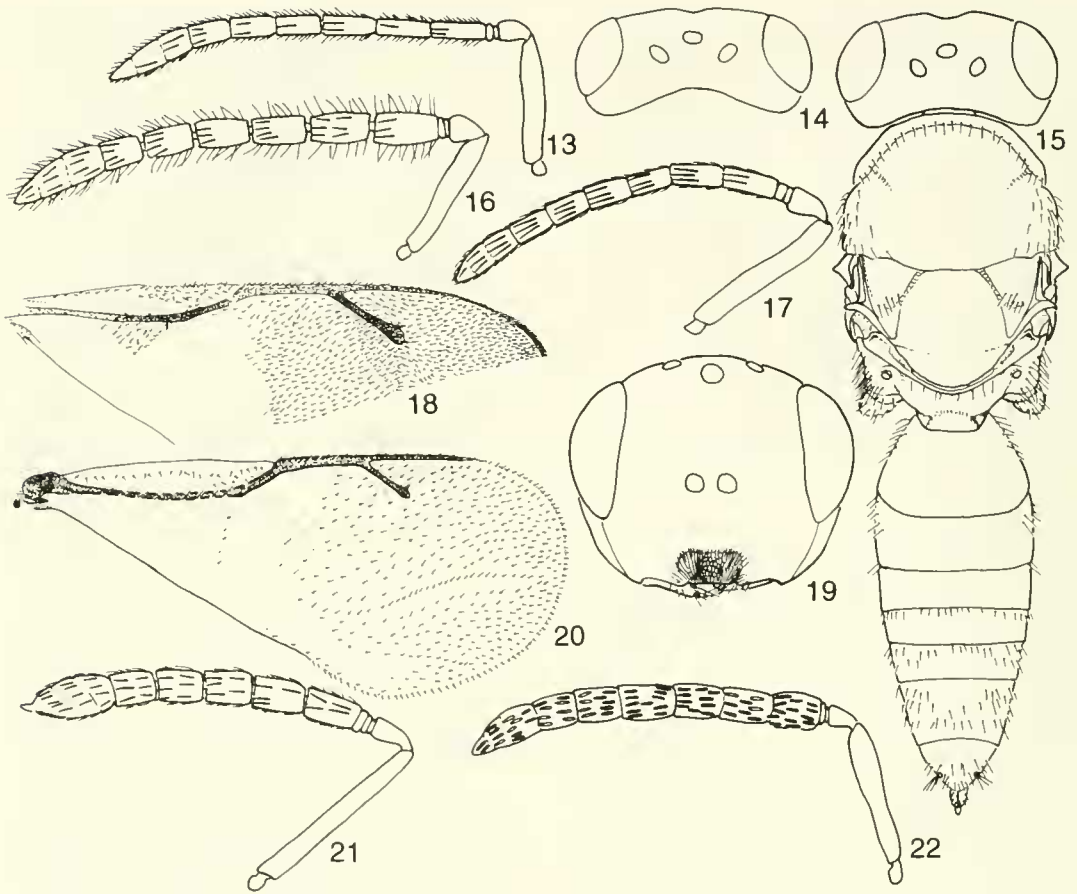
Biology.—*Guolina psenophaga* is a parasitoid of the summer generation of the jumping gall-forming cynipid, *Neuroterus saltatorius*. *Neuroterus saltatorius* makes small peppercorn-sized galls on the bottom side of the leaves of either blue oak (*Quercus douglasii*) or valley oak (*Quercus lobata* Née). I reared *Guolina psenophaga* from *Neuroterus* on both these oak species. *Guolina psenophaga* is also known to me from *Neuroterus saltatorius* on *Quercus garryana*

Douglas ex Hooker on Vancouver Island, British Columbia (Dr. Bob Duncan, Forestry Canada, pers. comm.). At least in California, there are probably several generations per year because *Guolina psenophaga* emerges from galls throughout the summer and new hosts are always available.

Quercanus Heydon, NEW GENUS

Type species.—*Quercanus luteogaster* Heydon, 1994.

Description.—Body color dark to bright metallic. Sculpture of head and mesosoma (including median panels of propodeum but excluding upper mesepimeron) minutely but coarsely alveolate (Fig. 12); upper mesepimeron smooth; gaster with T1 smooth, remainder coriaceous. Head with clypeus striate except for smooth strip along anterior margin; anterior margin of clypeus with median portion broadly but weakly to almost imperceptibly produced and truncate, straight mesally (Fig. 19); face with striae only in immediate vicinity of clypeus; gena convex about mandibles; toruli below center of head, above LOcL; occiput lacking carina. Antenna in both sexes with 2 anelli and 6 funicular segments (Figs. 13, 16, 17); flagellum weakly clavate; F1 longer and at most slightly wider than pedicel; club of female with or without an enlarged patch of micropilosity. Mesosoma with pronotal neck very short (Fig. 12), with short horizontal collar which lacks smooth anterior transverse carina (although the anterior borders of the sculpturing form a fine, irregular ridge along the anterior margin of the collar in *Q. viridigaster*); notauli incomplete; scutellum broadly abutting mesoscutum (Fig. 12); frenal area demarcated by area of distinct texture; propodeum with more or less well developed median carina, plicae only weakly developed, spiracles short ovate and about their own longest diameter from metanotum, nucha weakly developed convex lunated region (Figs. 12, 15). Gaster sessile, at most as long as combined length of head and mesosoma (Fig. 15), broadly ovate but



Figs. 13-22. *Quercanus luteogaster*, male. 13, Antenna. *Quercanus viridigaster*, female. 14, Head, dorsal view. *Quercanus luteogaster*, female. 15, Whole body, dorsal view. *Quercanus viridigaster*, male. 16, Antenna. *Quercanus luteogaster*, female. 17, Antenna. 18, Forewing. 19, Head, anterior view. *Lysirina polychroma*. 20, Forewing, female. 21, Antenna, female. 22, Antenna, male.

acuminate at tip; hind margin of T1 straight (Fig. 15) or very weakly emarginate. Forewing with well developed speculum which is not bounded by setae posteriorly; postmarginal vein longer than stigmal vein; stigmal vein nearly as long as marginal vein (Fig. 18). Hind leg with coxa setose dorsally (Fig. 12); tibia with one apical spur.

Quercanus differs from most Nearctic pteromalid genera by having setae on the dorsal surface of the hind coxa (Fig. 12). Among the genera having such setae, *Quercanus* comes phenetically closest to *Dinotiscus* Ghesquière with whom it shares a pronotum with a sharp edge between the

neck and collar (other related genera have the collar more smoothly rounding into the neck), absence of a strongly developed convex nucha, the lack of distinct patches of setae on the ventrolateral side of the first gastral tergite, elongate funicular segments (Figs. 13, 16, 17), a relatively elongate postmarginal vein, and rather stout legs. Characters separating *Quercanus* from *Dinotiscus* include the mostly striate clypeus, absence of a transverse carinae on the anterior margin of the pronotal collar, straight and well developed median carina of the propodeum, and unenlarged stigma. *Dinotiscus* species have a reticulate clypeus, a

transverse carina on the anterior margin of the pronotal collar, a less well developed median carina of the propodeum, and usually an enlarged stigma. The host relations also differ because *Quercanus* species are known from galls and *Dinotiscus* species are parasitoids of bark beetles.

Etymology.—The name is an arbitrary combination of letters based on the generic name for oak, *Quercus*. The gender is feminine (as is *Quercus*).

Biology.—All host records for *Quercanus* are from Cynipidae. The only described species of *Quercanus* for which there is specific host data is *Q. viridigaster*, which is known from two species of gall-making Cynipidae on oaks (*Antron echinus* and *A. quercusechinus*). One male, in the UCDC collection, of what is probably an undescribed species of *Quercanus* was reared from *Diplolepis tuberculatrix* (Cockerell) (Cynipidae) on *Rosa californica* Chamiso and Schlechtendal (Rosaceae).

KEY TO NEARCTIC SPECIES OF
QUERCANUS HEYDON

- 1. Female. Body bright green; coxae and gaster mostly yellow. Ratio of head length to head width less than 2.1 (Fig. 15). Terminal club segment with almost no micropilosity. Male. Funicle with setae of basal segment semierect and only 2/3 as long as width of basal funicular segment (Fig. 13) *Q. luteogaster* Heydon
- Female. Body dull green or blue-green; coxae and gaster mostly metallic dark green. Ratio of head length to head width more than 2.1 (Fig. 14). Terminal club segment with distinct patch of micropilosity on its ventral side. Male. Funicle with setae of basal segment more erect and as long as width of basal funicular segment (Fig. 16) *Q. viridigaster* Heydon

Quercanus luteogaster Heydon,

NEW SPECIES

Figs. 13, 15, 17-19

Description.—Holotype, female. Color: Head, mesosoma green; gaster mostly brownish yellow, but T1 with metallic green reflections and T6 and T7 metallic blue-green. Antenna with scape, pedicel brown-

ish yellow, pedicel slightly darker dorsally, flagellum brown. Legs brownish yellow except basal 1/2 of hind coxa and extreme base of forecoxa metallic green. Forewing with weak brown strip along inside margin of stigmal vein; submarginal, stigmal veins pale reddish brown; marginal, postmarginal veins pale yellowish brown.

Structure: Head width 1.2 × height (42.0:34.5) (Fig. 19), 1.9 × length (42:22) (Fig. 15); eye height 1.2 × length (21:17), 1.9 × malar distance (21:11), eye length 3.8 × temple length (17.0:4.5); torulus located about 2 × own diameter above LOcL; ratio of MOD, OOL, POL, LOL as 3.5:6.0:10.0:4.5. Antenna (Fig. 17) with length of pedicel plus flagellum 1.2 × head width (49:42); relative lengths of scape, pedicel, anelli, F1-6, club as 19.0:6.0:2.0:6.5:6.0:5.5:5.0:5.0:4.5:10.0; widths of F1, F6, club as 3.0:4.0:4.0; flagellum with setae fine, short, reclinate; club with small patch of micropilosity on terminal segment. Mesosoma length 1.2 × width (54:38). Forewing with length of submarginal, marginal, postmarginal, stigmal vein as 46:22:26:17 (Fig. 18); costal cell setose in apical 2/3, one setal row in basal 1/3. Gaster length 0.87 × combined length of head plus mesosoma (60:69) (Fig. 15), 2.0 × width (60:30); hind margin of T1 weakly convex but with hind margin of T1 nearly straight across; hypopygium extending 1/2 gastral length.

Allotype, male.—Similar to holotype except pedicel brown dorsally; apical 4 tergites dark purplish black. Antenna with length of pedicel plus flagellum 1.4 × head width (54:38); relative lengths of scape, pedicel, anelli, F1-6, club as 16.0:5.0:2.0:8.0:7.0:6.5:6.5:6.0:5.5:11.0; relative widths of F1, F6, club as 3:3:3; flagellar setae at 45° angle, moderately dense, length 2/3 width of funicular segments (Fig. 13).

Variation.—Female body length varies from 2.2-3.3 mm. Females are usually green, like the holotype, but one is blue-green; however, the body always has a bright luster unlike that of *Q. viridigaster*. Most of the

dorsal surface of T4–T5 is dark brown in 2 specimens. The brown band along the inside edge of the stimal vein is present in 4 specimens, absent in one. The ratio of head length to width for 5 females measured varied from 1.9 to 2.0. The ratio of pedicel plus flagellum length to head width of 3 female specimens measured varied from 1.1 to 1.2.

Type material.—The holotype (UCDC), allotype (UCDC), and 7 female and 3 male paratypes (BMNH, UCDC, USNM) all emerged in November 1967 from *Quercus chrysolepis* Leibmann (Fagaceae). They were reared by K. R. and M. R. Hobbs.

Etymology.—The specific epithet comes from the yellow color of the female gaster.

Biology.—The type series emerged from *Quercus chrysolepis* in November 1967, presumably from some cynipid gall but this is not stated on the label.

Quercanus viridigaster Heydon,

NEW SPECIES

Figs. 14, 16

Holotype, female.—Color: Head, mesosoma dark blue except vertex and dorsum of mesosoma blue-green; gaster dark reddish brown, T1 and lateral parts of T5–T6 with metallic blue-green reflections. Antenna with scape, pedicel, anelli brownish yellow, flagellum light brown. Legs with coxae dark brown with dark blue metallic reflections; remainder yellow-brown, femora slightly darker than remainder. Forewing veins pale brown, membrane clear.

Structure: Body length 2.3 mm. Head width $1.3 \times$ height (46:36), $2.2 \times$ length (46:21) (Fig. 14); eye height $1.4 \times$ length (23:16), $2.1 \times$ malar distance (23:11), length $3.6 \times$ temple length (16.0:4.5); torulus located $2 \times$ own diameter above LOCL; ratio of MOD, OOL, POL, LOL as 3.5:6.0:11.0:5.0. Antenna with length of pedicel plus flagellum $1.0 \times$ head width (47:46); relative lengths of scape, pedicel, anelli, F1–6, club as 20.0:5.0:2.0:6.0:6.0:5.5:5.0:5.0:4.5:9.0; relative widths of club as 3:4:5; micropilosity in long strip down ventral side of ter-

minal 2 club segments; setae on flagellum reclinate, of average length and density. Mesosoma length $1.4 \times$ width (54:39). Forewing with length of submarginal, marginal, postmarginal, stigmal veins as 44:18:21:16; costal cell setose in anterior $\frac{1}{2}$ of apical $\frac{1}{3}$, with 1 complete row of setae. Gaster length $0.60 \times$ combined length of head and mesosoma (42:70), $1.4 \times$ width (42:30); hind margin of T1 weakly convex but with broad shallow median emargination; hypopygium extending $\frac{2}{5}$ gaster length.

Allotype, male.—Similar to holotype except vertex and dorsum of mesosoma dark green, apical $\frac{1}{2}$ of T1 and all of T2 brownish yellow; legs paler, almost yellow. Body length 2.0 mm. Antenna with length of pedicel plus flagellum $1.4 \times$ head width (55.5:40.0); relative lengths of scape, pedicel, anelli, F1–6, club as 16.5:4.0:1.0:8.0:7.5:7.0:6.0:6.0:5.0:1.0; relative widths of F1, F3, club as 3:3:4; flagellar setae erect, especially on basal funicular segments, length about equal to width of funicular segments (Fig. 16).

Variation.—Body size of females examined varied from 2.3 to 2.8 mm; males from 1.6 to 2.4 mm. The color of the gaster is not a useful character for separating males of *Quercanus* because most males of *Q. viridigaster* have a yellowish area at the base of the gaster like males (and females) of *Q. luteogaster*. The ratio of head length to width for 10 females measured varied from 2.2 to 2.4. The ratio of pedicel plus flagellum length to head width of 10 female specimens measured varied from 0.96 to 1.0.

Type material.—The holotype and allotype (both UCDC) emerged in August of 1967 from galls of *Antron douglasii* on *Quercus lobata* collected at Folsom Lake (near Folsom), California (USA) by Dr. Charles Dailey. Twenty-two female and 13 male paratypes were collected as follows (BMNH, CNC, UCDC, USNM): United States. CALIFORNIA: Davis, em.1.1967 [ex *Antron douglasii* (unisexual gen.) on *Quercus lobata*], 1 ♂, 14.XI.1960 (*Quercus lobata*), 1 ♂, XII.1935, 1 ♀, XII.1936 (*Antron*

echinus), 1 ♀; along Putah Creek south of Davis, 29.III–3.IV.1990 (malaise trap), 1 ♀, Folsom Lake (near Folsom), em. 14.IV.1962 (ex *Antron echinus* on *Quercus*), 1 ♀, em. VII.1967 (ex *Antron echinus* on *Quercus*), 1 ♂; 5 miles sw. Madison, em. I.1967 (*Quercus lobata*), 2 ♀, 1 ♂; Rocklin, em. 4.II.1967 [ex *Antron echinus* (unisexual gen.) on *Quercus douglasii*], 2 ♀, 1 ♂, em. 8.IV.1962 (ex *Antron douglasii* on *Quercus lobata*), 1 ♂, em. 14.IV.1962 (ex *Antron douglasii* on *Quercus lobata*), 1 ♀, 1 ♂, em. 22.IV.1962 (ex *Antron douglasii* on *Quercus lobata*), 3 ♀, 2 ♂, em. 5.V.1962 (ex *Antron douglasii* on *Quercus lobata*), 1 ♀, em. VII.1967 (ex *Antron douglasii* on *Quercus lobata*), 1 ♂, em. 10.IX.1967 [ex *Antron echinus* (unisexual gen.) on *Quercus douglasii*], 1 ♀, em. 14.IX.1967 [ex *Antron echinus* (unisexual gen.) on *Quercus douglasii*], 2 ♂, em. XII.1961 (ex *Antron douglasii* on *Quercus lobata*), 8 ♀; Solano Lake, west of Winters, 21.III.1967 (*Quercus lobata*), 1 ♀.

Etymology.—The species name refers to the green gaster in the females of this species.

Biology.—*Quercanus viridigaster* is mostly known from the summer generation of two cynipids, *Antron quercusechinus* (Osten Sacken) (current name for *Antron echinus*) on blue oak, *Quercus douglasii*, and from *Antron douglasii* (Ashmead) on valley oak, *Quercus lobata*. *Antron quercusechinus* makes the distinctive spiny urchin galls on the leaves of blue and scrub oaks (Russo 1979). *Antron douglasii* makes another distinctive leaf gall called the spiny turban gall on the leaves of valley, blue and scrub oaks (Russo 1979).

Lysirina Heydon, NEW GENUS

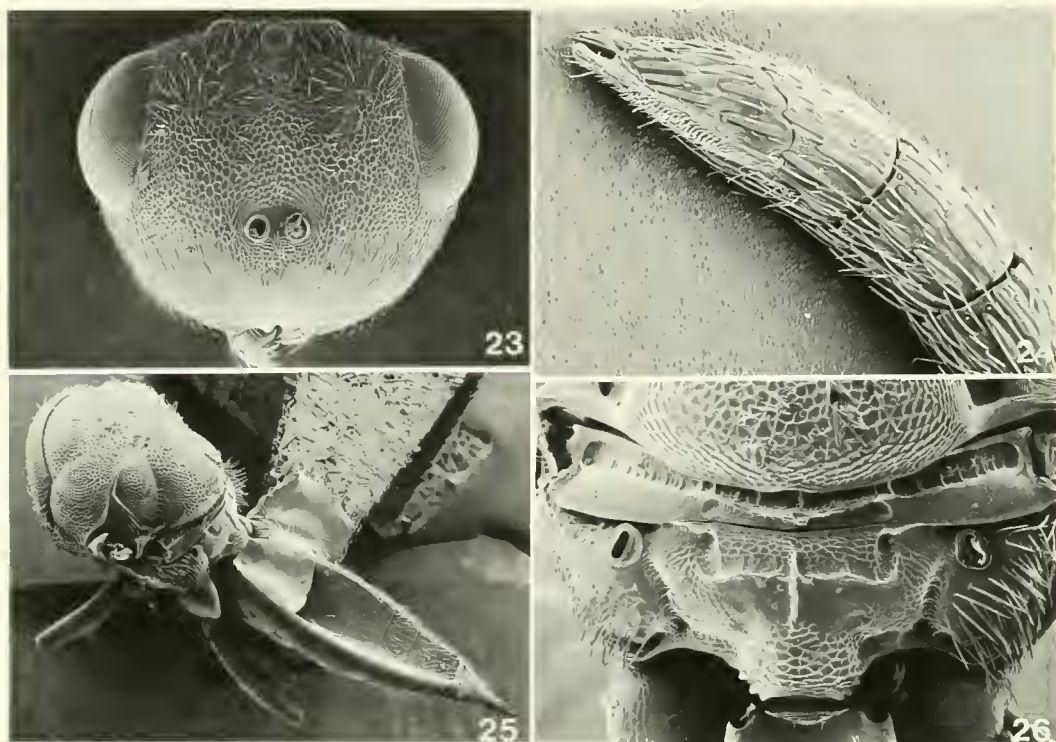
Type species.—*Lysirina polychroma* Heydon, 1994.

Description.—Body color black with more or less well developed but diffuse metallic spots in lateral lobes of mesoscutum and lateral parts of middle lobe. Body generally alveolate (Fig. 25); face striate below toruli

(Fig. 23); upper mesepimeron smooth. Head in dorsal view with face strongly convex; clypeus with two apical denticles on anterior margin (Fig. 23); toruli at LOcL; occipital carina lacking. Antenna of female with 3 anelli and 5 funicular segments (Fig. 21); club with sutures asymmetrical, with ventral line of micropilosity, with terminal finger like spica (Fig. 24). Antenna of male with 2 anelli and 6 funicular segments (Fig. 22); funicular segments lacking setae and with numerous MPP sensilla. Mesosoma compact, about as wide as long (Fig. 25); notauli incomplete; prepectus small (as small or smaller than tegula); scutellum broadly abutting mesoscutum; propodeum with broad shallow groove between basal foveae which is bordered posteriorly by carinate edge (Fig. 26), with globose nucha, spiracles ovate and at anterior margin of propodeum. Gaster lanceolate (Fig. 25); sessile; hind margin of T1 convex. Forewing with speculum; marginal vein and postmarginal vein longer than stigmal vein (Fig. 20). Legs with hind coxa highly convex, bare dorsally (Fig. 25); hind tibia with 1 apical spur.

Diagnosis.—The terminal spica on the female club (Fig. 24) and the small prepectus place this genus somewhere near *Norbanus* Walker. *Lysirina* differs from *Norbanus* in having 3 anelli and 5 funicular segments in the females (Fig. 21) and the propodeum with a broad shallow groove between the basal foveae and a globose nucha (Fig. 26). *Norbanus* species have 2 anelli and 6 funicular segments in the females and the propodeum is uniformly reticulate and relatively featureless. *Callitula* Spinola also has a terminal spica on the female club and 3 anelli and 5 funicular segments, but *Callitula* species have the clypeus strongly truncate, the prepectus larger than the tegula, the propodeum with the median panels lacking the anterior depression bordered posteriorly by a carinate edge and the nucha much larger, and the basal gastral tergite much enlarged.

Etymology.—*Lysirina* is named in honor



Figs. 23–26. *Lysirina polychroma*, female. 23, Head, anterior view. 24, Antennal club. 25, Mesosoma and gaster. 26, Propodeum.

of Dr. Lynn Siri Kimsey, Director of the Bohart Museum at the University of California, Davis.

Biology.—Nothing is known of the host(s) of *Lysirina* species.

Lysirina polychroma Heydon,

NEW SPECIES

Figs. 20–26

Holotype, female.—Color: Head with face bluish black, vertex more coppery green. Mesosoma black with bluish reflections on nucha and dorsolateral region of collar; greenish reflections on lateral lobes and anterolateral portions mesoscutum, metanotum, lateral and posterior regions of propodeum; callus coppery green. Gaster weakly yellowish green but T1 with strong coppery reflections; T2–5 with dorsoapical ½ non-metallic. Antenna with scape yellow-brown but progressively more dark blue metallic

over apical ½; pedicel, anelli black; F1–3 yellow-brown; F4–5, club brown. Legs with femora dark metallic blue except pale reddish brown at tips; tibiae pale reddish brown, white at tips; tarsi white at base turning brown apically. Forewing with membrane clear; veins brownish yellow, parastigma and stigma reddish brown.

Sculpture: Dorsal parts of head, dorsum of mesosoma alveolate; propodeum (including nucha) with alveolae more weakly developed (Fig. 25), region between costula and nucha smooth (Fig. 26).

Structure: Body length 2.5 mm. Head width $1.3 \times$ height (51:40) (Fig. 23), $2.2 \times$ length (51:23); eye height $1.4 \times$ length (22.5:16.0), $1.3 \times$ malar distance (22.5:17.0), eye length $16 \times$ temple length (16:1); ratio of MOD, OOL, POL, LOL as 3.0:7.0:12.5:5.5. Antenna (Fig. 21) with length of pedicel and flagellum $0.88 \times$ head width (45:51); rela-

tive lengths of scape, pedicel, anelli, F1–5, club as 21.0:5.0:2.0:7.0:6.0:5.5:5.0:5.0:9.5, relative widths of F1, F5, club as 3.0:4.0:4.0; MPP sensilla in two rows on each funicular segment. Mesosoma length $1.1 \times$ width (46:43). Relative lengths of submarginal, marginal, postmarginal, stigmal veins as 32:18:18:9. Gaster length $1.0 \times$ combined length of head and mesosoma (66:62), $2.9 \times$ width (66:23); hypopygium extending $\frac{1}{3}$ length of gaster.

Allotype, male.—Similar to holotype except antenna with scape mostly dark metallic; flagellum dark dorsally, pale ventrally; tibiae mostly dark reddish brown. Body length 2.0 mm. Antenna (Fig. 22) with relative lengths of scape, pedicel, anelli, F1–6, club as 14.0:3.0:1.0:7.0:6.0:5.5:5.5:5.0:4.5:9.0, relative widths of F1, F6, club as 4.0:3.0:3.0; MPP sensilla white, prominent, in 3 rows on basal segments, 2 rows on apical segments (Fig. 22); flagellum nearly glabrous, much broader than pedicel.

Variation.—*Lysirina polychroma* is highly variable in body color. The females from northern California (Woodland and near Winters) tend to be dark with the metallic patches on the mesoscutum poorly developed; those from further south tend to have the metallic patches larger and more distinct. Two have the mesoscutum almost entirely metallic except for dark, non-metallic strips along the notauli and its midline. The antennae of the two males from northern California are dark but have white MPP sensilla that stand out prominently; the two males from southern California have the antennae pale and the MPP sensilla are nearly invisible. If the lighting is proper, however, the MPP sensilla can be seen and they are in about the same numbers and arrangement as for the more northerly specimens. Body length of females varies from 2.2 to 3.2 mm; males from 2.0 to 2.3 mm. The third anellus in females is sometimes annulate, much wider than long, but in other females it is quadrate, about as long as wide.

Type material.—The holotype (UCDC)

was collected in a Malaise trap exposed 30 August to 12 September 1990 in Stebbins Cold Canyon Reserve, 11 km west of Winters, California (USA) by D. Carmean. The allotype and one male paratype (both UCDC) were collected from the same Malaise trap exposed between 13–26 June 1991. Nine other paratypes were collected as follows (BMNH, UCDC, USNM): United States. CALIFORNIA: 15 miles w. Baker, 6.V.1977, 1 ♀; Borrego Valley (near Borrego Springs), 9.IV.1970, 1 ♀, 11.IV.1969, 1 ♀, 2 ♂; Darwin Falls (~8.4 km ne. Darwin), 12.V.1974, 1 ♀, 17.V.1974 (*Eriogonum inflatum*), 1 ♀; Woodland, 5.VIII.1956, 1 ♀. NEW MEXICO: White Sands National Monument (~22 km wsw. Alamogordo), 24.VIII.1971, 1 ♀.

Etymology.—The species name refers to the multiple colors exhibited in specimens of this species.

Biology.—The host(s) of *Lysirina polychroma* are unknown. One specimen from Darwin Falls, California was collected on *Eriogonum inflatum* Torrey and Fremont (Polygonaceae). The Malaise trap in which the holotype and allotype were collected was located in a rather dense stand of coast live oak (*Quercus wislizenii* A. DC.) (Fagaceae).

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Science Foundation Grant BSR-9020206. The acronym for the Canadian National Collection, Ottawa, Canada, is CNC and for the University of California, Davis, California, collection is UCDC.

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